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C-A OPERATIONS PROCEDURES MANUAL

4.44.4 Procedures for Downloading a PASS SLC Program into an EEPROM Memory Module and Uploading the Program to RAM.

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Hand Processed Changes

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Approved: _____ ***Signature on File*** _____
Collider-Accelerator Department Chairman Date

J. Reich

4.44.4 Procedures for Downloading a PASS SLC Program into an EEPROM and Uploading the Program to RAM.

1. Purpose

- 1.1 This procedure describes the steps required to download an Allen Bradley SLC program into an (Electrically Erasable Programmable Read Only Memory (EEPROM) memory module (1747M11 or equivalent). This procedure covers the A-Division SLC 5/03 and 5/04 processors only. This procedure will also cover installation of the EEPROM module into the Particle Accelerator Safety System (PASS) SLC processor module, as well as testing of the system to verify proper downloading and operation. The EEPROM allows a ladder logic program file to be reloaded into the processor RAM by cycling the power to the PLC off and then back on.

2. Responsibilities

- 2.1 Prior to implementation of any changes to previously base lined PASS hardware or software system logic, the cognizant Access Controls Group (ACG) Leader is responsible to request they be reviewed and approved.
- 2.2 The RSC Chair is responsible for reviewing this procedure in a manner consistent with the review cycle for the RSC procedures.
- 2.3 After a program is downloaded to EEPROM the responsible individual performing the download shall verify that the EEPROM checksum matches the checksum of the source code. In addition a comparison shall be made of the original ladder logic program and the program that is now loaded in the EEPROM using Allen-Bradley RS Guardian software.

3. Prerequisites

- 3.1 The only person permitted to download software into the EEPROM Modules will be the designated individual assigned responsibility for either A-Division software or B-Division software.

4. Precautions

- 4.1 The SLC processor should **NEVER** be removed or installed without initially powering down the rack.
- 4.2 An EEPROM for a 5/03 or 5/04 processor can only be programmed using a similar model processor in the test rack. See Allen Bradley publication 1747-6.2 page 2-22.

- 4.3 Handling of EEPROM modules and Allen Bradley Processor modules shall be done with extreme care. Handling techniques designed to minimize static electricity shall be followed.

5. Procedure

- 5.1 The following procedure will describe the steps for downloading the SLC Program into the EEPROM Memory Module. Using an Allen Bradley Test Station and a Development System.
- 5.2 Once you have verified that you have selected the correct program (for the AB system in question) to download and this program is operating normally, you can begin the download procedure to write the program into the EEPROM module. Downloading will be done via a development station to a non PASS Allen Bradley (AB) test system. The EEPROM module will then be physically transferred and installed in the PASS system in question.
- 5.2.1 Install an EEPROM module on the card of the spare SLC processor. Install the processor in the test rack, apply power, and connect the communication cables to the development system. Ensure that the key switch on the processor is set to '**REM**' or '**PROG.**'
- 5.2.2 On the development system, use RSLogix500 to open the ladder logic file to be loaded on the EEPROM. Verify that the node number corresponds to the Peer that will use the EEPROM.
- 5.2.3 From the '**Comms**' menu, choose '**System Comms...**'
That will spawn a popup communications window.
- 5.2.4 With the proper communications driver chosen, choose the '**Who Active**' button, which starts the RSLinx communications program. Choose the test rack processor in RSLinx and return to the RSLogix500 popup window.
- 5.2.5 Choose the '**Download**' button in the popup window. A prompt appears for a revision note, enter one if desired then select '**OK**'.
- 5.2.6 A prompt appears asking to proceed with download, select '**Yes**'.
- 5.2.7 A prompt may appear if the test rack processor node number does not match the node number in the file you are downloading. If this occurs, select '**No**' to keep the project settings.
- 5.2.8 Another popup window may appear if the test rack processor has a different communication configuration than the program file. Select '**Apply**' to change the node number and continue.

5.2.9 In the main RSLogix500 window under the '**Comms**' menu, choose '**Go Online**'. Note the checksum from the status data table.

5.2.10 Click on "**Processor Status**" (this is data file S2).

5.2.11 Scroll to the right until you see "**Mem Module**".

5.2.12 Click on that tab.

5.2.13 Set the following bit to logic "1".

- Load memory module and run (S:1/12).

5.2.14 Under the 'Comms' menu, choose '**EEPROM**' then '**Store to EEPROM**'.

5.2.15 A popup window appears to confirm; check the '**Normal Protection**' radio button then select '**OK**'. The EEPROM loading will initiate. The SLC processor's 'RUN' light blinks green while this is in progress.

5.2.16 After the loading is complete, cycle the power to the test rack. In the RSLogix500 window, select '**Retry**' to go online once again. Compare the checksum in the status data table and ensure that it matches that of step 5.1.9 (This is true only if the program was previously written to use EEPROMS, otherwise it will not match as stated in the above note). Record the checksums after the EEPROMS have downloaded into RAM. In addition a comparison shall be made of the original ladder logic program and the program that is now loaded in the EEPROM using Allen-Bradley RS Guardian software.

5.2.17 Power down the rack, remove the processor, and remove the EEPROM module from the processor. Label it with the Peer, program revision, and checksum that were loaded.

Note:
**Insert The EEPROM in an Anti-static Bag as Soon as the EEPROM is
Removed from the Allen Bradley Test Station.**

5.3 The following procedure will describe the steps for installing the programmed EEPROM module in the field SLC.

This procedure should only be performed by a qualified individual.

5.3.1 Power down the rack for the Peer SLC and remove the processor.

- 5.3.2 Remove the EEPROM from the anti-static bag.
- 5.3.3 Install the appropriate EEPROM module on the SLC processor card.
- 5.3.4 Install the SLC processor in its rack and apply power. The EEPROM module will load the program file to processor RAM on power-up. Ensure the keyswitch remains in 'RUN.'

6. **Documentation**

The initial load and install shall be documented in the log along with the compare results and the checksums.

7. **References**

- 7.1 SLC 500 Modular and Fixed Memory Modules installation instructions (Publication 1747-5.1).
- 7.2 Memo from T. Tallerico to Neville Williams dated 11/16/99 (EEPROMS used in the Building 921 PASS System).
- 7.3 Allen Bradley publication 1747-6.2 November 1995 (page 2-22).

8. **Attachments**

None